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Application No. S2001/0583

Date of Filing 25 JUNE 2001

Applicant SHAPES & SOLUTIONS LIMITED an Irish company of The Round House, Delgany, County Wicklow, Ireland.

Dated this 16 day of December 2003

An officer authorised by the
Controller of Patents, Designs and Trademarks.

REQUEST FOR THE GRANT OF A PATENT

PATENTS ACT, 1992

The Applicant(s) named herein hereby request(s)
_____ the grant of a patent under Part II of the Act

X the grant of a short-term patent under Part III of the Act
on the basis of the information furnished hereunder.

1. Applicant(s)

Name Shapes & Solutions Limited

Address The Round House
Delgany
County Wicklow
Ireland

Description/Nationality

An Irish company

2. Title of Invention

"Constructional Elements"

3. Declaration of Priority on basis of previously filed application(s) for same invention (Sections 25 & 26)

Previous filing date

Country in or for
which filed

Filing No.

4. Identification of Inventor(s)

Name(s) of person(s) believed
by Applicants(s) to be the inventor(s)

Name: Cameron Ross John Clarke, an Irish citizen.

Address: The Round House, Delgany, County Wicklow, Ireland.

5. Statement of right to be granted a patent (Section 17(2) (b))

The Applicant derives the rights to the invention by virtue of a Deed of Assignment dated June 25, 2001.

6. Items accompanying this Request - tick as appropriate

- (i) X prescribed filing fee (£50.00)
- (ii) specification containing a description and claims
 X specification containing a description only
 X Drawings referred to in description or claims
- (iii) An abstract
- (iv) Copy of previous application (s) whose priority is claimed
- (v) Translation of previous application whose priority is claimed
- (vi) X Authorisation of Agent (this may be given at 8 below if this Request is signed by the Applicant (s))

7. Divisional Application (s)

The following information is applicable to the present application which is made under Section 24 -

Earlier Application No:

Filing Date:

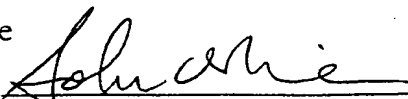
8. Agent

The following is authorised to act as agent in all proceedings connected with the obtaining of a patent to which this request relates and in relation to any patent granted. -

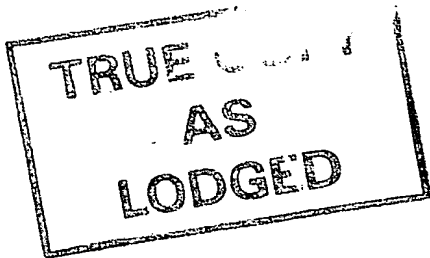
<u>Name</u>	<u>Address</u>
John A. O'Brien & Associates	The address recorded for the time being in the Register of Patent Agents, and currently Third Floor, Duncairn House, 14 Carysfort Avenue, Blackrock, Co. Dublin, Ireland.

9. Address for Service (if different from that at 8)

As above

Signed  JOHN A. O'BRIEN & ASSOCIATES

Date June 25. 2001.



APPLICATION No.

8010583

SHAP05/P/IES1

- 1 -

"Constructional Elements "

Introduction

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The invention relates to constructional elements such as panels, masonry walling, pillars, kerbing, paving and the like.

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Pointed brick and stone products are expensive to produce and considerable skill and time is required to construct a wall or pave an area using such products. In an effort to avoid these problems various attempts have been made to produce "artificial" products which have facings of expensive material but using less expensive base materials. In general such products are not satisfactory either because they are difficult to make and or do not achieve the same aesthetic effect as conventional products. There is therefore a need for improved constructional elements, which are relatively cheap and easy to produce and yet achieve the aesthetic effect of brick, stone and the like.

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Statements of Invention

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According to the invention there is provided a method for casting a cementitious constructional element with a facing comprising the steps of:-

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placing a mould mat in a mould, the mould mat comprising a grid defining a plurality of recesses therebetween;

casting a facing material in the recesses of the mould mat;

30

casting a cementitious material to a desired thickness on top of the cast facing material; and

removing the cast panel thus formed from the mould.

5 In one embodiment the method includes the step after casting of the facing and prior to casting of the cementitious material, of placing an insert grid over the grid pattern of the mould mat. Preferably the insert grid is shaped to form recessed mortar joints in the cementitious material.

10 In a preferred embodiment the method includes the step of applying a retaining force to the insert grid to retain the retaining grid in a desired position during casting of the cementitious material. The retaining force may be applied by a spring bias from the retaining grid/cage. Alternatively the retaining force is applied by a positioning tool. Preferably the method includes the step of inserting the positioning tool into the mould to engage the insert grid and retain
15 the grid in position during casting of the cementitious material.

In one embodiment the facing material is a brick or brick-like material. Alternatively the facing material is a cementitious material. The facing material may include a colouring agent.

20

In another embodiment the method comprises the step of inserting a masking tool to engage the grid pattern of the mould mat and withdrawing the masking tool prior to casting of the cementitious material.

25 In another aspect the invention provides a method for producing a stone-like effect with mortared joints. A masking tool is pressed against a mould mat to cover the areas which would correspond to mortared joints. A retarder is then applied to the remaining surface of the mould mat. The masking tool is removed, the retarder allowed to dry and the mould mat is placed in a mould
30 box to produce a casting, typically of a cementitious material. After curing,

water is applied to the face of the casting to expose the aggregate of the cementitious material.

5 The invention also provides novel constructional elements especially when produced by a method of the invention.

The invention further provides novel casting apparatus especially for use in the methods of the invention.

10 Brief Description of the Drawings

The invention will be more clearly understood from the following description thereof given by way of example only, in which: -

15 Fig. 1 is a perspective view of a constructional element according to the invention;

Fig. 2 is a cross sectional view illustrating apparatus used in a method for producing the element of Fig. 1;

20

Figs. 3(a) to 3(c) are respectively plan, elevational and cross sectional views of a mould box forming part of the apparatus of Fig. 2;

25

Figs. 4(a) to 4(c) are respectively plan, elevational and cross sectional views of a mould mat forming part of the apparatus of Fig. 2;

Figs. 5 (a) to 5(c) are respectively plan, elevational and cross sectional views of an insert grid forming part of the apparatus of Fig. 2;

Figs. 6(a) to 6(c) are respectively plan, elevational and cross sectional views of a positioning tool forming part of the apparatus of Fig. 2;

5 Fig. 7 is an exploded cross sectional view of an apparatus used to produce constructional elements with an exposed aggregate stone-like effect;

Fig. 8 is an exploded cross sectional view of a mould mat and associated mortar mat;

10 Fig. 9 is a cross sectional view of the mould mat and mortar mat of Fig. 8 assembled with a backing material and facing material in place;

Fig. 10 is an exploded cross sectional view of a mould mat and a mortar mould channel mask;

15 Fig. 11 is a cross sectional view of the mould mat and mask of Fig. 10, assembled with a facing mix in place;

20 Fig. 12 is a cross sectional view illustrating a first step in another processing method of the invention;

Fig. 13 is a cross sectional view illustrating a second step in the method;

Fig. 14 is a cross sectional view illustrating a third step in the method;

25 Fig. 15 is a cross sectional view of a finished casting; and

Fig. 17 is a perspective view of the casting with a sectioned front face.

Detailed Description

Referring to the drawings and initially to Fig. 1 there is illustrated a constructional element 1 according to the invention which in this case comprises a backing 2 of cementitious material which is faced with a facing 3 simulating brick with imitation mortar joints 4 therebetween. By way of illustration an element having two brick-like facings is shown however, the element may be of any desired shape or configuration and may contain one or several such facings in any desired pattern. The element may be used, for example, for masonry walling, paving and the like.

The constructional element may be manufactured using an apparatus as illustrated in Fig. 2 and comprising a mould box 10, a mould mat 11, an insert grid 13 and a positioning tool 12 for holding the insert grid 13 in position during casting. The insert grid 13 defines the desired artificial mortar joints 4 which are visible on de-moulding and removal of the insert grid 13.

The mould mat 11 comprises a grid which defines a plurality of recesses 20 therebetween. In general, the upper face, in use, of the mat grid is planar.

The insert grid 13 which may be referred to as a mortar mould has a curvilinear upper surface to define the mortar joints 4.

In use, the mould mat 11 is placed flat on a support surface. A pourable brick or other facing mix is then poured into the recesses 20 of the mat 11. Vibration is used to remove bubbles and excess material. The upper faces of the mat 11 are then scraped-off, if necessary, to clean the surface and remove excess facing material. Alternatively the flat tops of the mould mat may be temporarily masked while the brick mix is being poured. This facilitates a thicker layer of brick mix being loaded into the mould. The mould box 10 is placed around the

mat 11 and the mortar mould 13 is placed over the mat 11 with the curlinear faces uppermost. The positioning tool 12 is then inserted to engage the mortar mould 13. Concrete backing to a desired thickness is poured into the mould box 10 on top of the mortar mould 13. Vibration is used to remove bubbles from the poured concrete. On setting, the constructional element 1 thus formed is demoulded by inverting the mould box 10, removing the box 10, stripping off the mould mat 11 and finally stripping off the mortar mould 13 to reveal the cast element illustrated in Fig. 1.

The invention enables the mass production of pointed masonry walling, paving and the like to be achieved by making, straight from a mould, a perfect imitation of a mortared joint.

It will be noted that mould mat 11 has depressions which form the finished brick/stone face and sidewalls which form the small projections of the finished brick/stone face. Typically the mould mat 11 is cast against pointed masonry to form an exact facsimile. Prior to the mould mat 11 being cast, the mortar mould 13 is cast into the recessed mortar joints so that the mould mat is cast against masonry and the flat top of the in-situ mortar mould 13. The mortar mould 13 does not completely fill the recessed mortared joints, but allows a small distance usually between 1 to 5 mm for the sidewalls of the mould mat 11 to be formed.

Thus, the recess depth in recessed pointing is used to form the mortar mould 13. The small projection often found in pointed masonry of the brick/stone from the recessed mortar joint is also incorporated.

In more detail, in use the shallow depressions in the mould mat 11 are filled with a cementitious substance having an aggregate size no larger than the depth of the recesses 20. This mixture is suitably coloured to imitate the desired effect, typically of brick or stone. The mixture is then vibrated to remove air bubbles

from the face of the casting and also to remove excess cementitious material. The upper surface of the sidewalls of the mould mat 11 can, if necessary be further cleaned using a straight rule-like instrument, used with a scraping action. The mould box 10 is then placed over the mould mat 11. The mortar mould 13 is placed on top of the mould mat 11 whereby the flat bottom of the mortar mould 13 engages with the flat tops of the sidewalls of the mould mat 11.

The mortar mould positioning tool 12 is then pressed down onto the mortar mould 13 in order to stop the mortar mould 13 from moving in relation to the mould mat 11 when the backing concrete is being poured and the whole assembly further vibrated. The colour of the backing concrete will determine the colour of the imitation pointing mortar.

The mortar mould positioning tool 12 is then removed and the casting allowed to cure. When the mould mat 11 is peeled from the casting, brick/stone work will appear with the mortar mould 13 covering the joints. When the mortar mould 13 is removed, a perfect imitation of the original mortared joints is revealed.

The mortar mould 13 could also be held in position by adhesive or magnetism. The positioning tool 12 could also engage onto a rigid mesh cage-like structure, which in turn engages with the mortar mould. Alternatively a spring loaded mesh cage-like structure could be used. This structure could be left in situ, within the casting, to avoid damage during removal. It might in that instance act as a reinforcing member. The invention can be used to produce a two or more faced casting by increasing the number of mould mat/mortar moulds within the mould box.

Referring to Fig. 7 there is illustrated an apparatus and a method for producing a stone-like effect with mortared joints. The joints can be recessed, flush or raised.

In this instance a masking tool 50 is pressed against a mould mat 51, covering the areas which would correspond to the mortar on the original masonry master. Concrete retarder is then applied for example by spray or brush to the remaining surface of the mould mat, which would correspond to the stone on the original master. The masking tool 50 is removed, the retarder allowed to dry, the mould mat placed in a mould box and a concrete casting produced. When the casting cures its face is sprayed with water to remove the thin uncured layer of material from the casting, caused by the action of the retarder, thus exposing the aggregate within the concrete to give a close semblance of natural stone or the like.

The masking tool 51 prevents any retarder from contacting any mortar areas of the mould mat and consequently the joints take the colour appearance out of the concrete and become indistinguishable from a more conventional mortared joint. It is also possible to produce a concrete casting using the same mould mat, engage a masking assembly and then apply a retarder/etcher suitable for use on cured concrete over the area of the casting meant to imitate stone and the like. A stone-like effect is produced where the retarder etcher has come into contact with the casting but also leaves the "mortar" effect where the masking assembly has covered the concrete. Alternatively the face can be sprayed with water instead of using a retarder/etching.

Referring to Figs. 8 and 9 there is illustrated another mould mat 60 and associated mortar mat 61. In this case means are provided for securing the mortar mat 61 to the mould mat 60. The securing means comprises a female groove 62 on the mould mat 60 and an associated male projection 63 on the mortar mat 61, the groove 62 and projection 63 engaging on assembly as illustrated in Fig. 8. In Fig. 8 a facing material 65 and a backing material 66 are also shown. The arrangement is similar to that described above with reference to Figs. 1 to 6.

Referring to Figs. 10 and 11 there is illustrated a mould mat 70 and a mortar mould channel mask 71 for masking a channel in the mould mat 70. The mat 70 and mask 71 have corresponding shaped grooves and projections for interengagement on assembly. A facing mix 75 on the mould mat 70 is vibrated, the channel mask 71 is removed and replaced by a mortar mould for further processing as described above.

Referring to Figs. 12 to 14 there is illustrated various steps in a method for casting a block 80 (Figs. 15 and 16) with cast-in grooves 81 and rebates giving a pointed masonry effect. Referring to Fig. 12 a mould comprises side walls 85 surrounding a mould mat 86 with upwardly projecting rounded ribs 87. A masking tool 88 has depending legs 89 with grooves 90 corresponding to the ribs 87 of the mortar mat 86. The arrangement provides a means for separating backing material from face material. In Fig. 13 the masking tool 88 is in position and a facing material 95 has been poured into the mortar mat 86. It will be noted that the depending legs 89 of the masking tool have angled faces 98 which assist in ease of removal of the masking tool 88. As the facing material is vibrated in the mould air bubbles are removed from the finished surface and the facing material rises up the angled faces 98 of the masking tool 88.

Referring to Fig. 14, following removal of the masking tool 88 a backing/mortar mix 99 is poured into the mould on top of the facing material 95 and the mould is again vibrated. A mortar effect is generated by the facing material 95 and a mortar effect is created by the grooves 81 which are left in the facing material 95 on removal of the mould mat 86. The mortared joint can be recessed as shown in Figs. 15 and 16, raised or flush.

Many variations on the invention will be readily apparent and accordingly the invention is not limited to the embodiment heretofore described, which may be varied in detail.

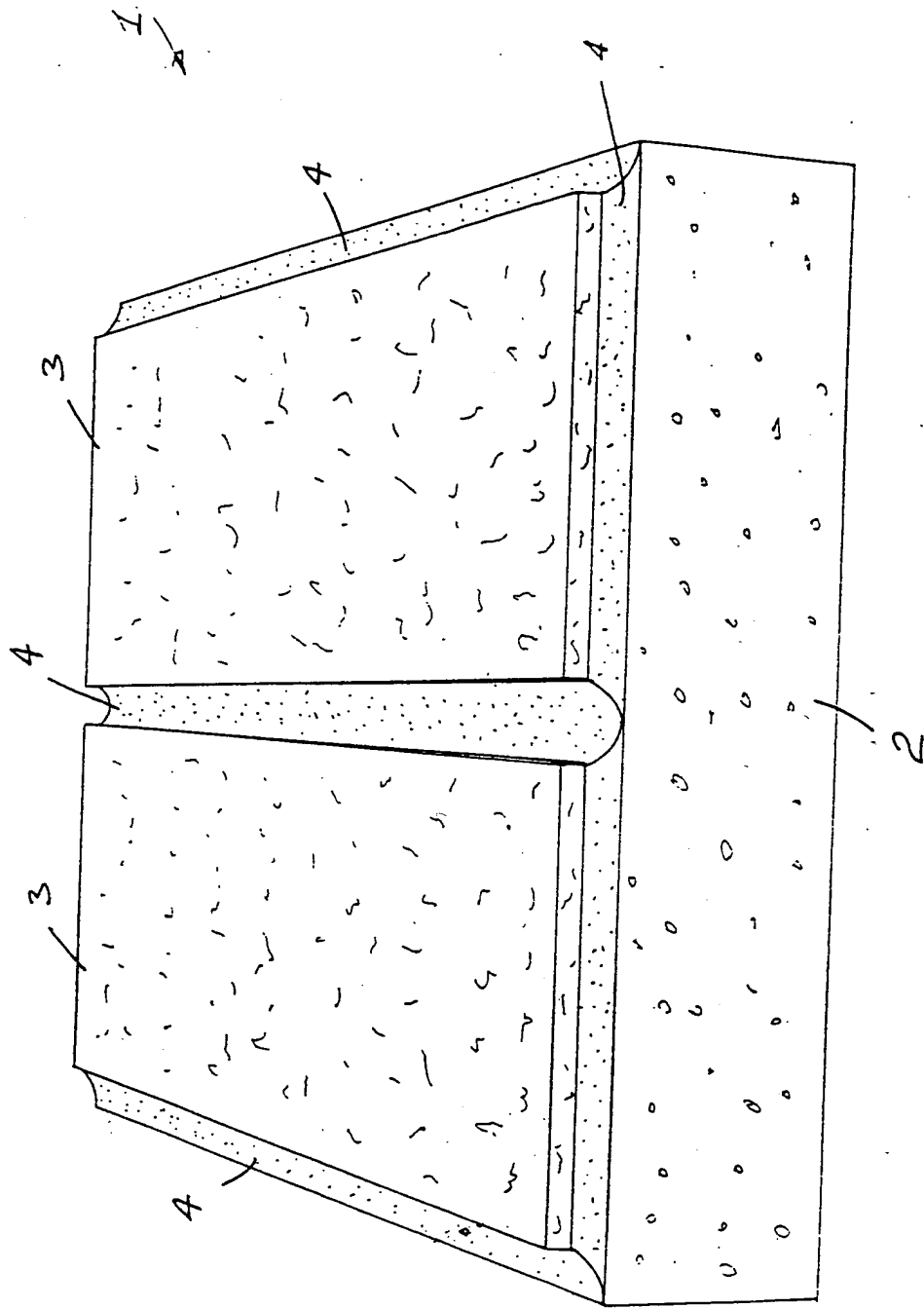


Fig. 1

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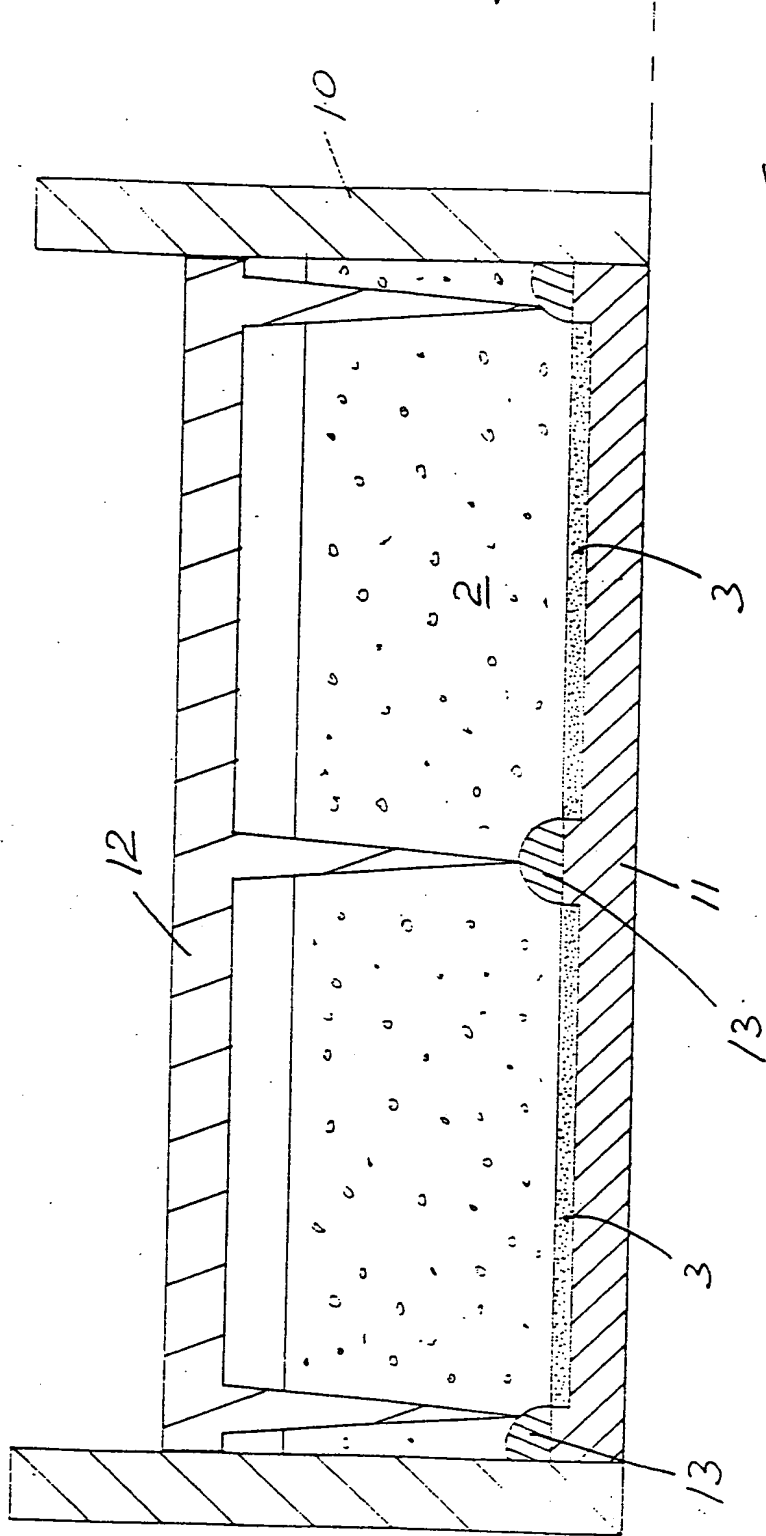


Fig. 2

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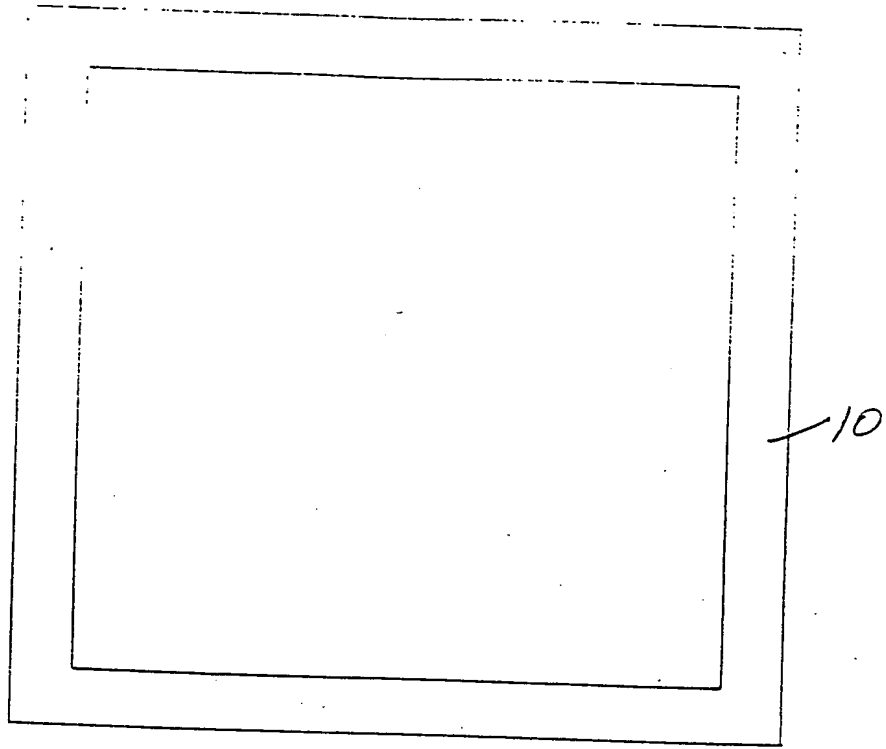


Fig. 3(a)

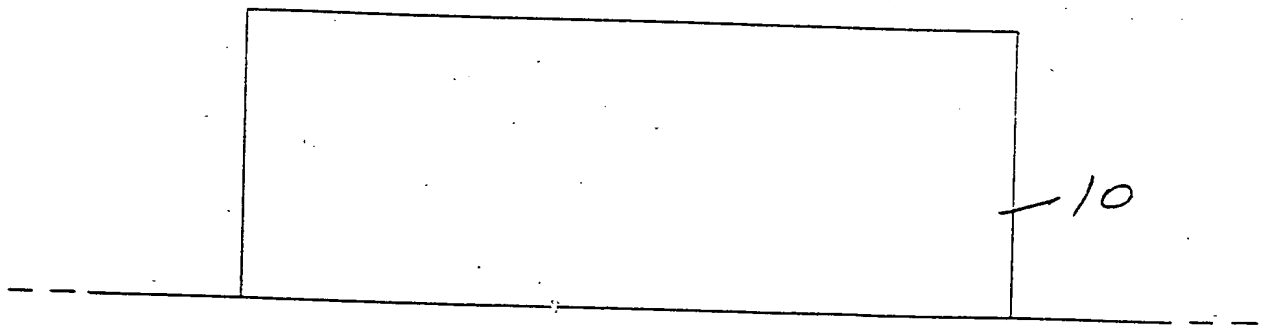


Fig. 3(b)

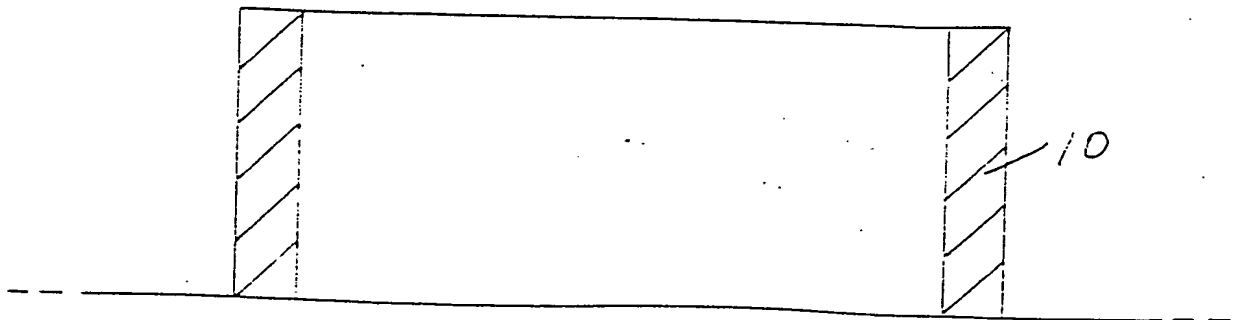


Fig. 3(c)

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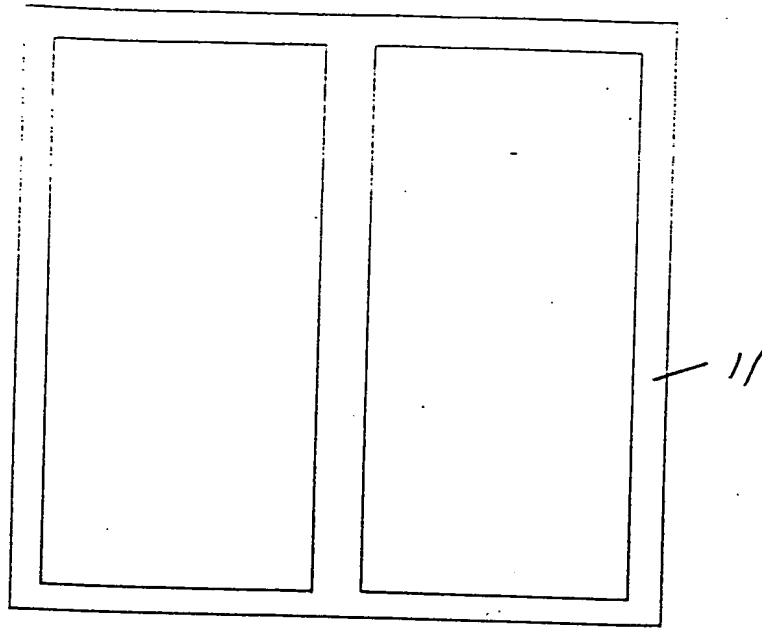


Fig. 4(a)

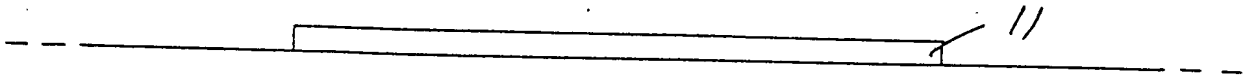


Fig. 4(b)

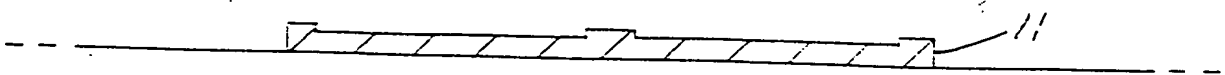


Fig. 4(c)

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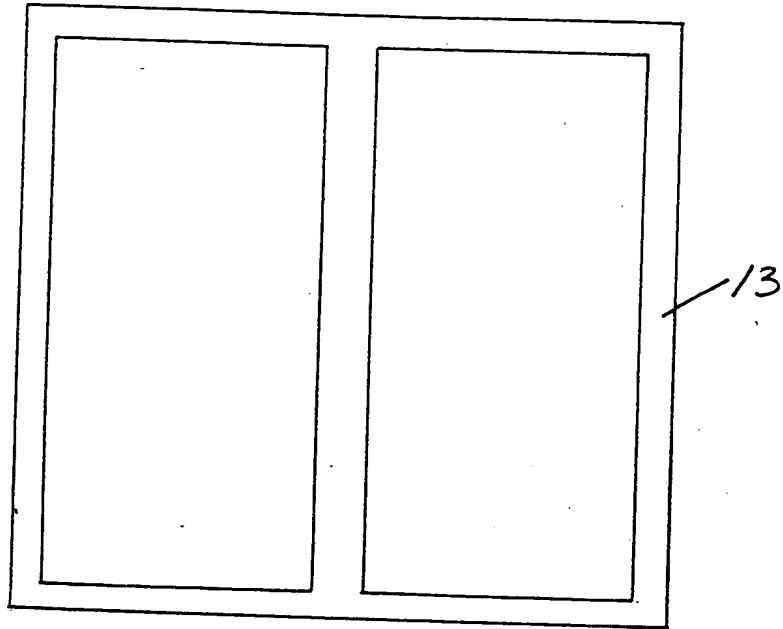


Fig. 5(a)

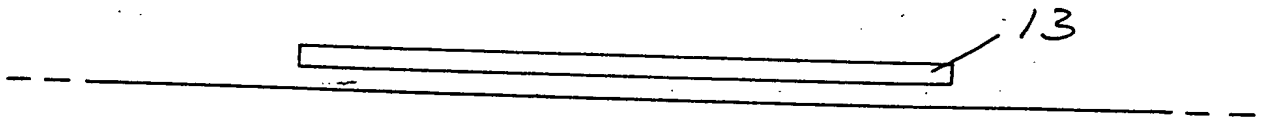


Fig. 5(b)

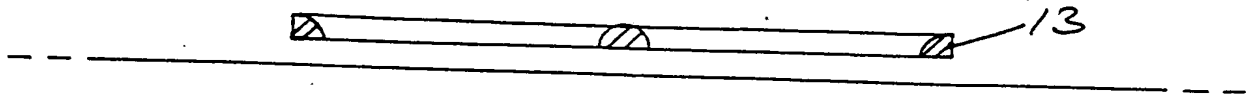


Fig. 5(c)

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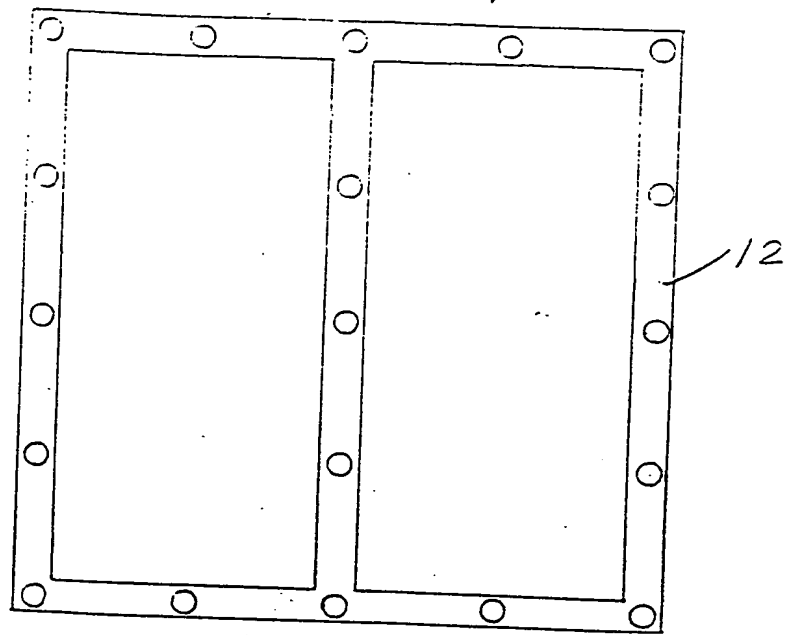


Fig. 6(a)

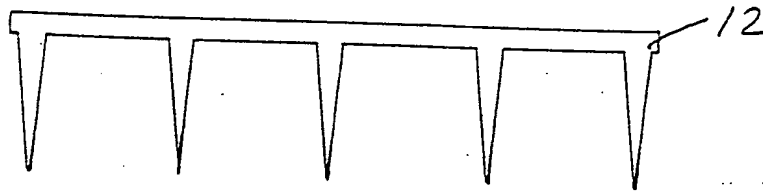


Fig. 6(b)

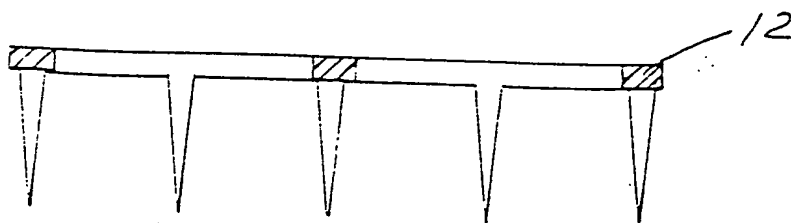
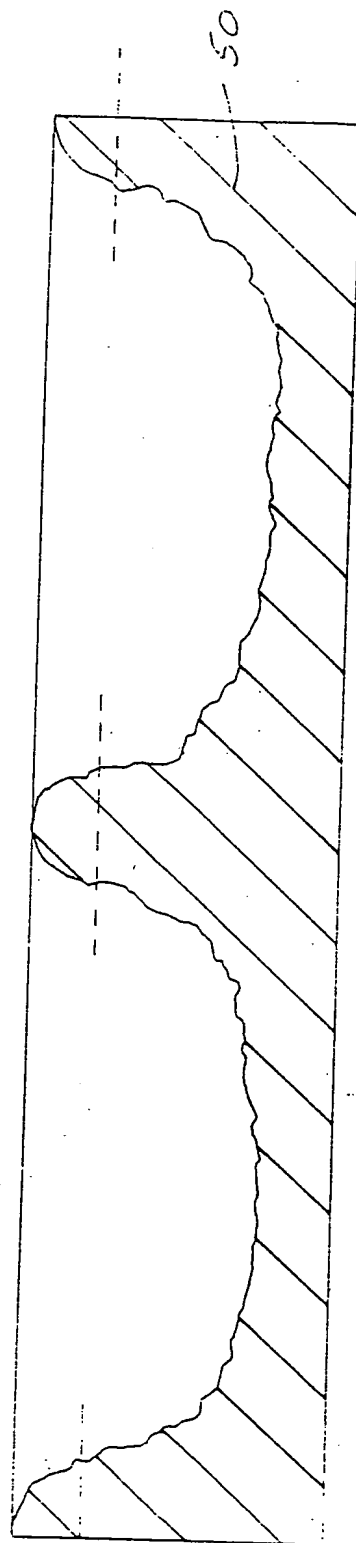
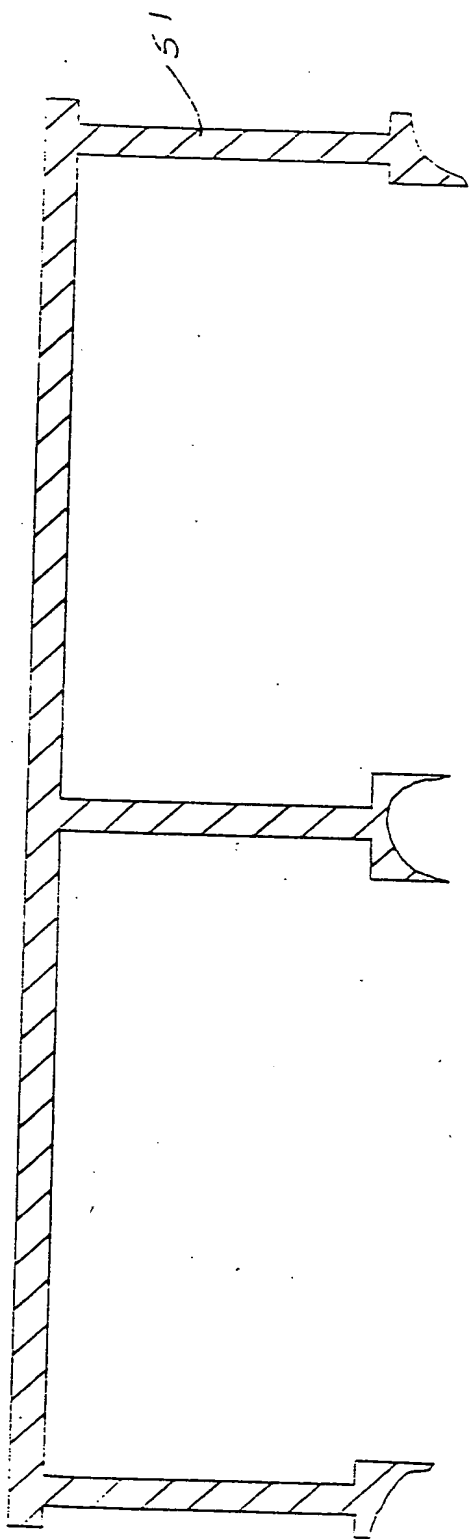


Fig. 6(c)

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Fig. 7



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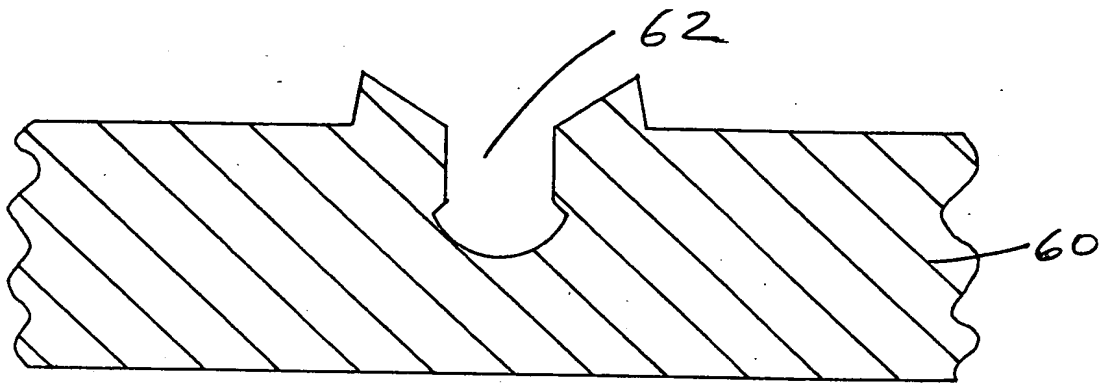
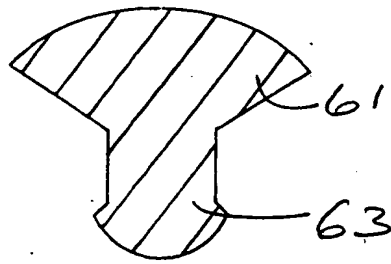


Fig. 8

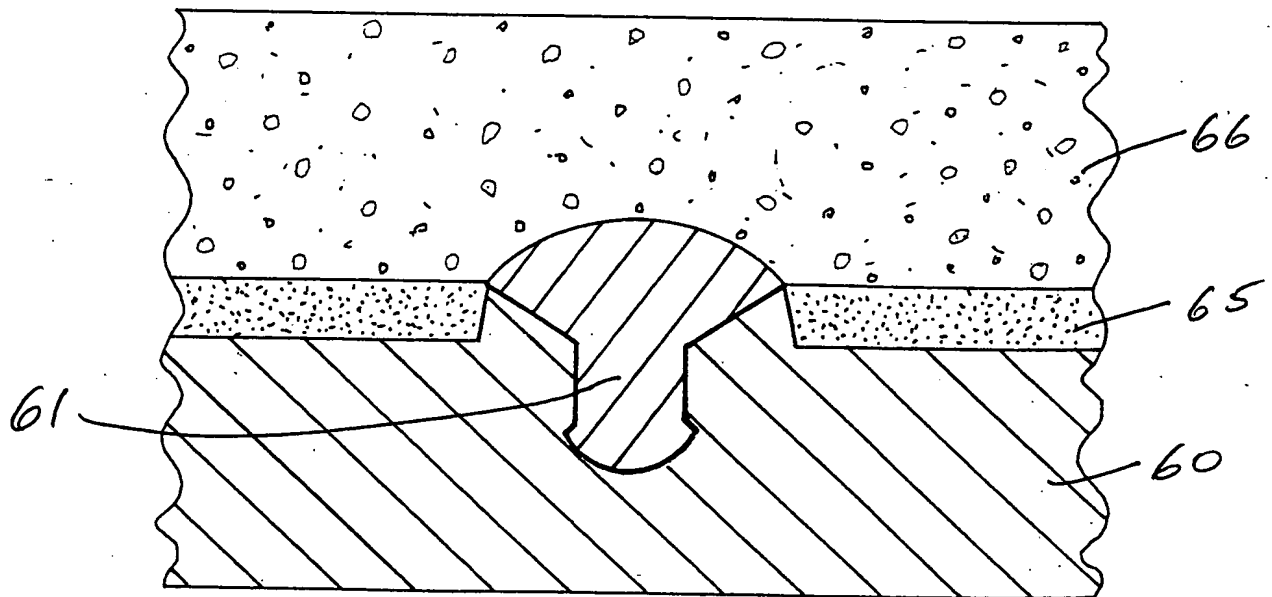


Fig. 9

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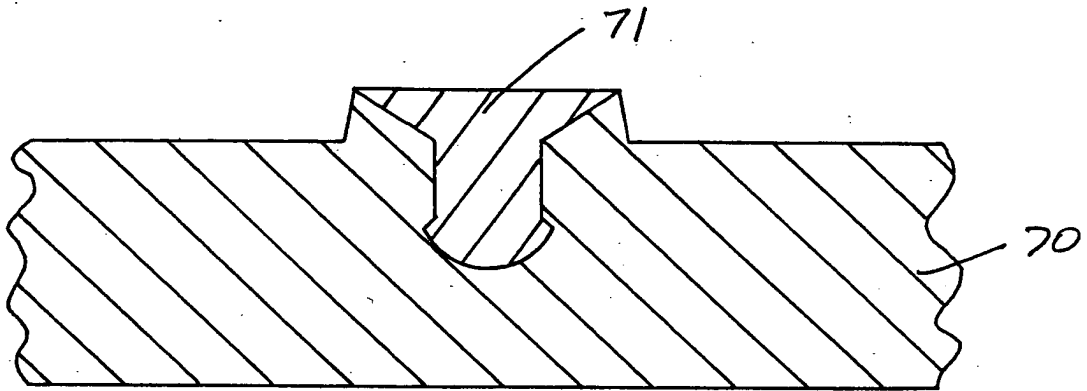
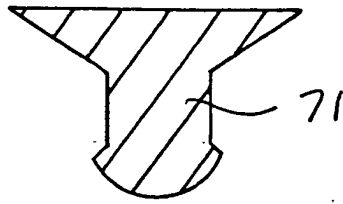


Fig. 10

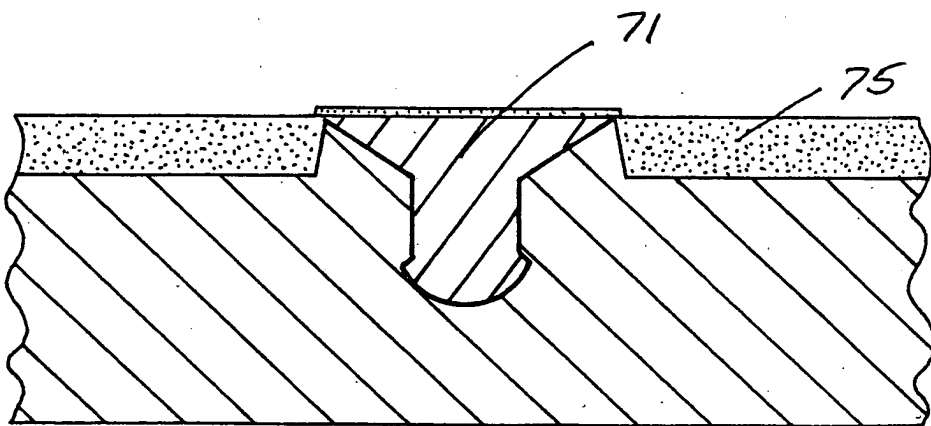


Fig. 11

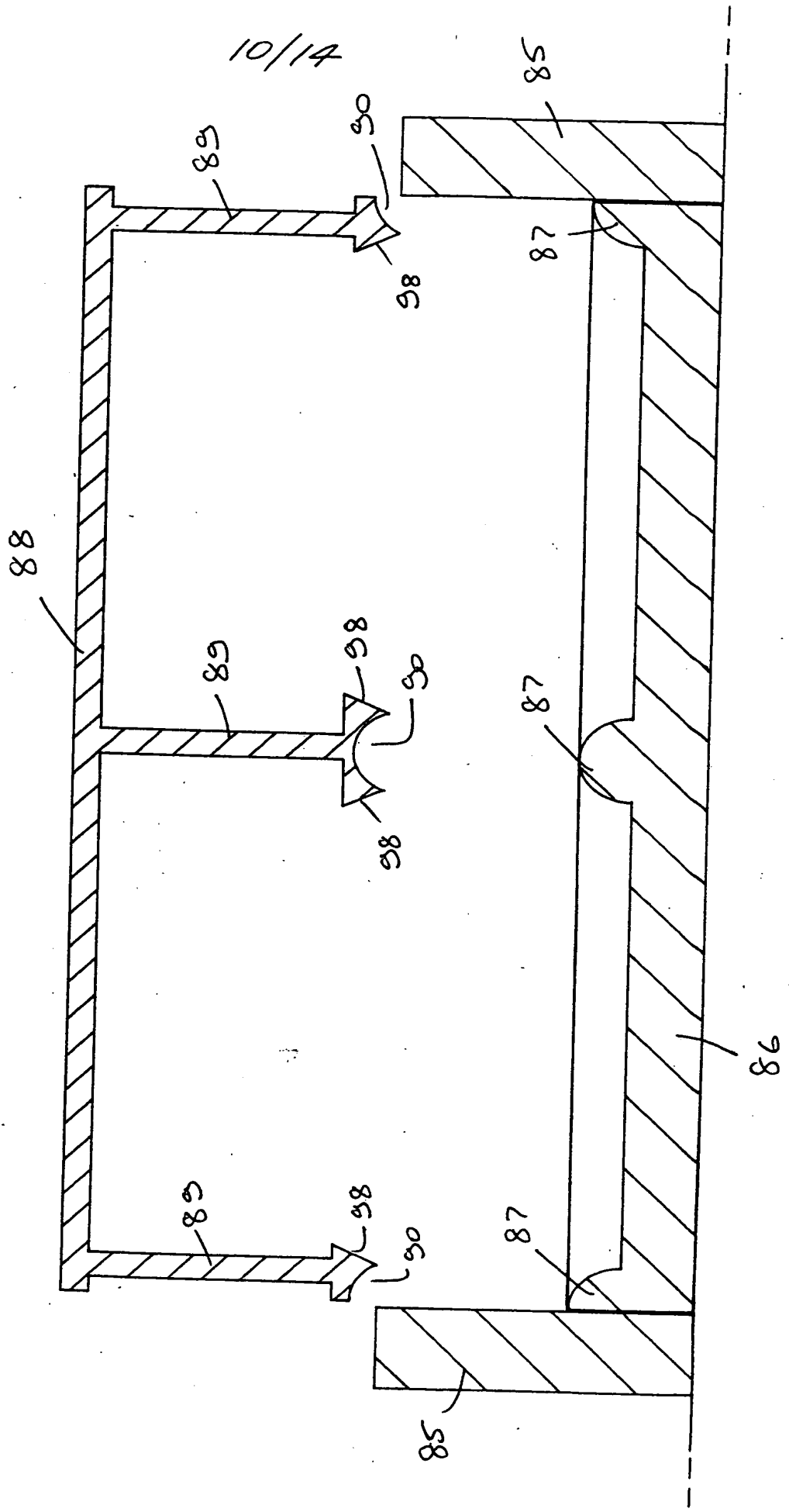


Fig. 12

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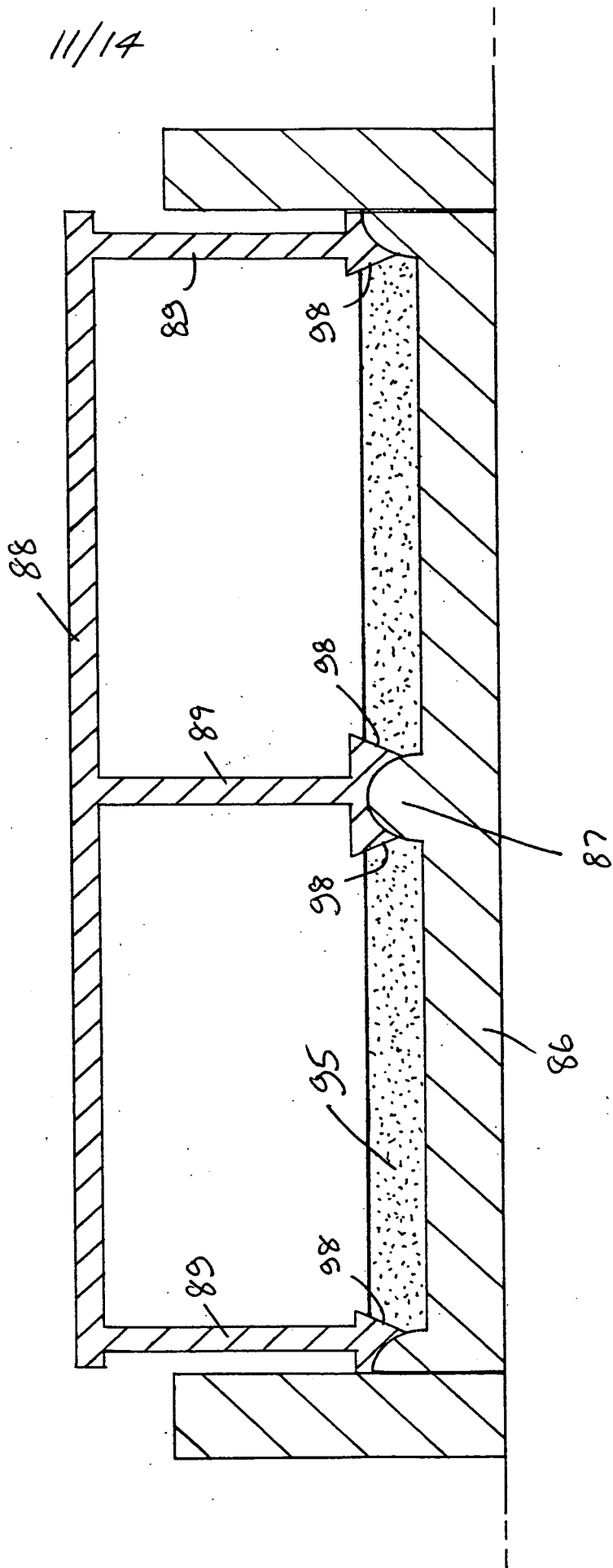


Fig. 13

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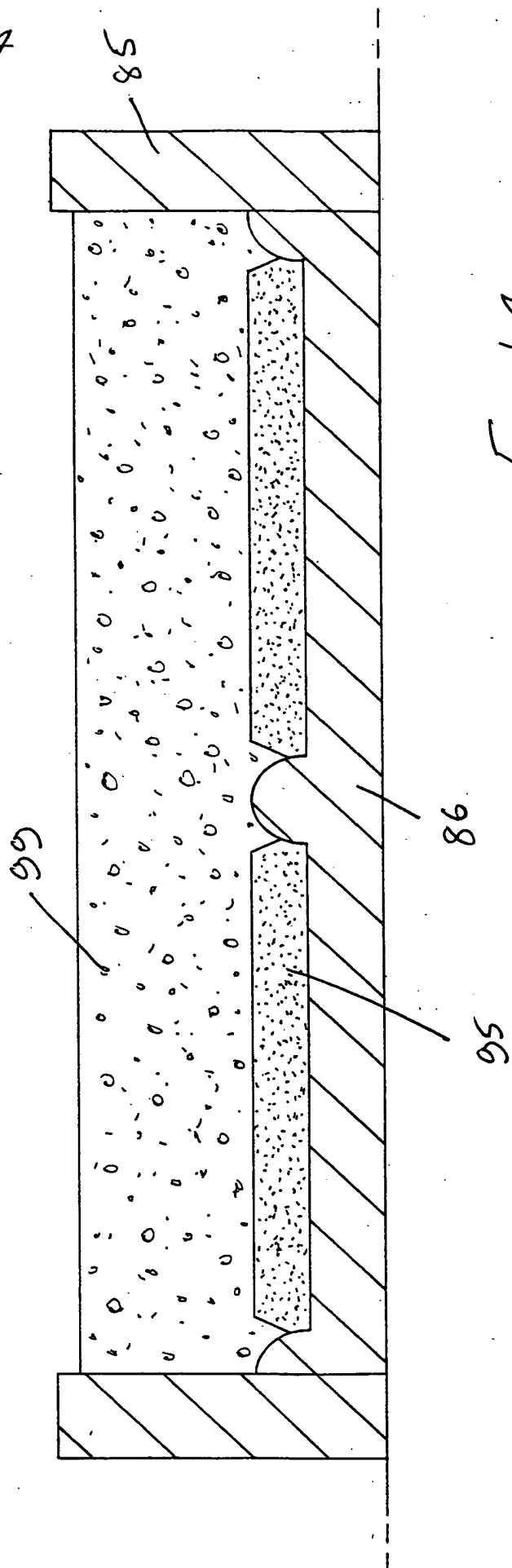


Fig. 14

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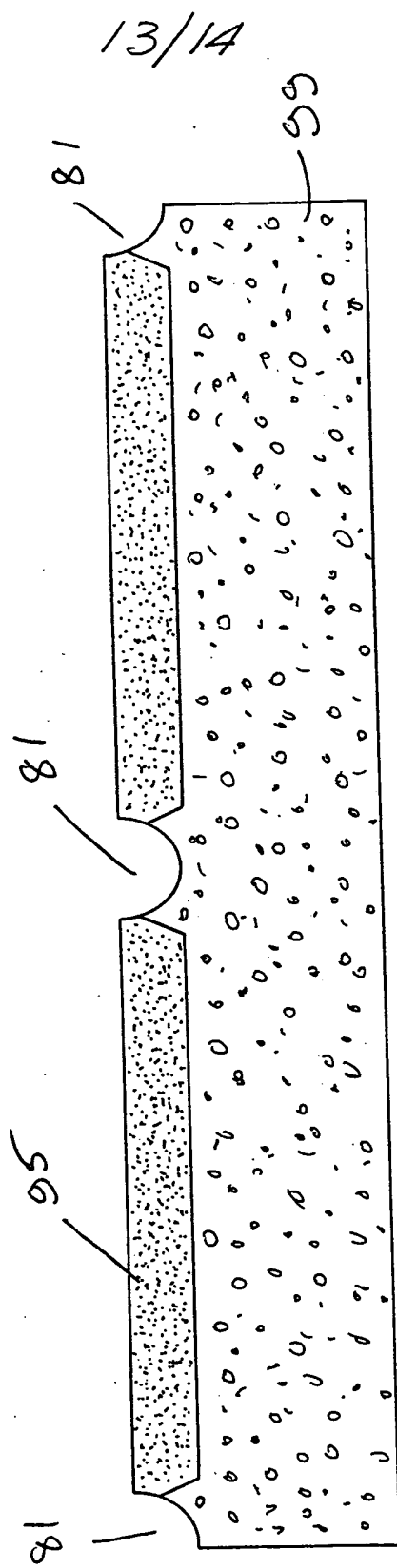


Fig. 15

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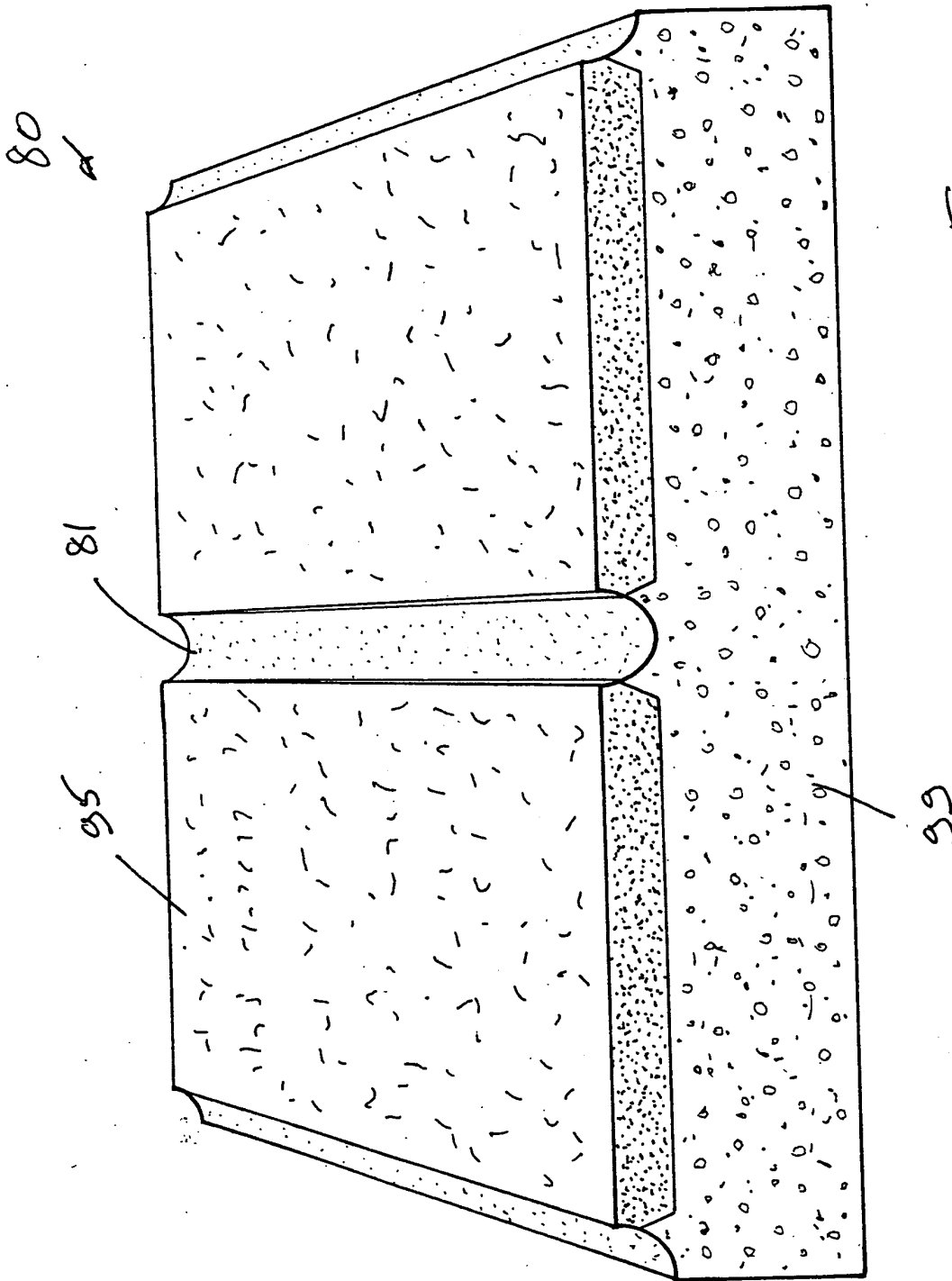


Fig. 16